USE OF FIBERS WITH A THREE-DIMENSIONAL CRIMP FOR THE MANUFACTURE OF INTERLINING OR STIFFENING FABRIC, AND INTERLINING FABRIC OBTAINED

The invention relates to the use of fibers with a three-dimensional crimp for the manufacture of interlining fabrics, such as stiffening fabrics for garments, and to the fabrics thus obtained.

The term "interlining fabrics", which are also called "stiffening fabrics", should be understood to mean especially plain-weave and twill-weave fabrics, nonwoven textile surfaces, felts, or surfaces with a napped appearance used especially as lining and retention fabrics in the making-up of garments.

These fabrics are also called "interlining".

Of course, the interlining fabrics may be used in other applications without thereby departing from the scope of the invention.

These interlining fabrics are used in making up garments in order to improve their strength, their esthetic appearance and their comfort.

These interlinings may be made from continuous yarns, spun yarns or fibers obtained from natural material, artificial material or synthetic material. In general, the continuous yarns are crimped yarns. The

crimped yarns or fibers are generally used to give bulk to the interlining.

However, in the case of nonwoven surfaces to which the invention more particularly relates, the crimped fibers used are fibers made of synthetic material, such as polyamide fibers, the crimp of which is generally obtained by mechanical crimping, that is to say the fibers have a two-dimensional crimp. This two-dimensional crimp has drawbacks since it generates a limited bulking effect. In addition, the curvature of each crimp is very pronounced, forming points which, to the touch, give a sensation similar to that generated by the ends of the fibers.

One of the objects of the present invention is to eliminate these drawbacks by providing nonwoven interlinings having a greater bulk and an improved appearance.

For this purpose, the invention proposes the use of fibers with a three-dimensional crimp and a yarn count of between 0.9 dtex and 5 dtex which are obtained by spinning a polyamide-based composition for the production of nonwoven interlinings, especially those used in the making-up of garments.

The nonwoven stiffening fabrics used as interlining may comprise a nonwoven surface coated on at least one face with a binding or sizing composition for its attachment to the fabric for making up the garment. It may comprise several layers of nonwovens

bonded together in a manner known per se. These nonwovens may also be combined with other textile surfaces of different type in order to produce the interlining.

The interlinings or nonwovens according to the invention may include other crimped or uncrimped fibers of the same or different material. They may also be combined with continuous yarns or spun yarns.

According to a preferred characteristic of the invention, the nonwoven surfaces of the invention have a grammage of between 10 g/m^2 and 200 g/m^2, preferably between 20 and 100 g/m^2.

According to a preferred characteristic of the invention, the crimped fibers used for producing an interlining advantageously have a yarn count of between 0.9 and 3.3 dtex.

The crimped fibers of the invention are obtained by spinning a composition based on a synthetic material, advantagecusly such as a polyamide or copolyamide.

As examples of polyamides or copolyamides suitable for the invention, mention may be made of polyhexamethylene adipamide, polycaprolactam, copolymers of these two polyamides or blends thereof. These polyamides may also include other repeat units such as sulfonate aromatic units, like the repeat unit derived from 5-sulfoisophthalic acid or the like, or

units derived from other dicarboxylic acids such as isophthalic or terephthalic acids or diamines.

Other polyamides may also be mentioned, such as PA-6,10, PA-4,6, PA-11 and PA-12.

The polyamides may also be used with various additives, such as pigments, matting agents, heat or light stabilizers, heat-protection agents, antimicrobial agents, antisoiling agents or the like. This list is in no way exhaustive.

As preferred polyamides, mention may be made of polyhexamethylene adipamide, polycaprolactam and copolyamides or blends comprising mostly hexamethylene adipamide units or polycaprolactam units.

The fibers may have varied cross-sectional shapes, such as round or multilobate shapes. The cross section may also comprise hollows.

The fibers are generally obtained from a single material. However, they may also be obtained from two or more materials - these fibers are called composite or bicomponent fibers of the "side by side" or "core/shell" type.

The process for manufacturing the crimped fibers used in the invention consists in spinning a large number of filaments through spinnerets, the filaments being taken up in the form of tow. The number of filaments per tow may vary over a wide range. This number is often greater than 100.

The tows are either fed directly into a drawing and crimping device, or several tows are assembled in order to make a sheet which will be fed into the drawing and crimping devices. After the drawing and crimping steps, the tows or sheets may be cut directly into short fibers (a few millimeters in length) or stored before being cut into fibers in a subsequent step.

The draw ratio applied to the fibers may vary widely, for example the draw ratio may be between 1 and 5. In the crimping step, the fibers are subjected to pneumatic crimping described below, generating a three-dimensional crimp making it possible to obtain fibers with a bulky appearance, and with the crimp ratio being maintained even under high tension.

The three-dimensional crimp is a crimp which lies at least in two cutting planes and which also generates pigtail-shaped loops or curls in the fiber. This crimp shape makes it possible to obtain nonwovens with a high bulk.

The process of the invention is, in a preferred embodiment of the invention, a continuous and integrated process which comprises the spinning, drawing, crimping and cutting steps in line.

Depending on the filament count, the spinning rate may vary from 500 m/min to 2500 m/min.

The spinning temperature is between 250°C and 300°C. The filaments leaving the spinneret are cooled by a fluid, which is advantageously air.

The filaments, after convergence in the form of a tow or sheet, undergo drawing, the draw ratio of which is advantageously between 1 and 5, preferably between 2 and 4.

This drawing is generally carried out between two or more trains of heated or unheated rollers. It may be carried out cold or at a temperature which may be as high as 120°C.

The drawn filaments are fed into a crimping or texturing stage according to the principle of air packing, described especially in French Patent No. 2 041 654. Thus, the filaments are entrained by a fluid heated to a temperature above 100°C in a nozzle, the filaments being taken up on an entraining roller at the outlet of the nozzle at a lower rate than the rate at which the filaments enter the nozzle. The filaments are packed into the nozzle, forming folds, the entraining fluid escaping sideways via holes provided in the wall of the nozzle.

The crimped tow is opened out and then fed into cutting means in order to produce fibers of defined length, for example advantageously between 5 and 200 mm.

The process of the invention makes it possible to obtain filaments and then fibers having three-

dimensional crimps, but with a minimum of entanglement between the filaments. Thus, after exiting the cutting means the fibers can be easily separated and are compatible for being used especially for the manufacture of nonwovens.

Further details and subjects of the invention will appear more clearly in the light of the illustrative examples given below solely by way of indication.

EXAMPLE 1

Fibers with a three-dimensional crimp are manufactured by spinning a copolymer comprising 98% PA-6,6 and 2% PA-6 having a relative viscosity after drying of 2.7 (the viscosity is measured using a solution of the polymer in 96% sulfuric acid).

The spinning is carried out using spinnerets comprising 180 holes with a diameter of 0.3 mm. The spinning rate is 660 m/min.

The tow comprising 180 filaments is fed into a roller drawing process. The draw ratio applied is 3.

Next, the tow is fed into an air texturing process which is supplied with air at 260°C and a pressure of 9 bar.

The crimped tow is fed directly into a cutting system.

The fibers obtained have a yarn count of 2.8 dtx and a tenacity of 42 cN/tex, an elongation of 54% and a crimp contraction of 12%.

The fibers are used for the manufacture of a nonwoven used as interlining in garments.

EXAMPLE 2

Fibers with a three-dimensional crimp are obtained according to the process described in Example 1 but using, as polyamide, a nylon-6 of relative viscosity equal to 2.7 (measured in 96% H_2SO_4). The polyamide also contains 0.3% by weight TiO_2 as a lustering agent.

The spinning rate is 870 m/min and the draw ratio applied is equal to 3.

The air fed into the air-crimping device is at a temperature of 240°C and a pressure of 9 bar.

The crimped tow is wound up onto a bobbin at a rate of 2300 m/min.

The tow thus obtained is unwound in a cutting device after having undergone a heat treatment and the deposition of a size.

The fibers obtained have a yarn count of 1.7 dtex, a tenacity of 50 cN/tex and an elongation of 74%. The crimp contraction is 14.5%.

These fibers are used for the manufacture of a nonwoven for interlinings.